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AUTHOR Yu, John
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ABSTRACT

The Instructional Management System (IMS) developed by the Southwest Regional Laboratory (SWRL) processes student and teacher-generated data through the use of an optical scanner that produces a magnetic tape (Scan Tape) for input to IMS. A series of computer routines, OPSN, preprocesses the Scan Tape and prepares the data for transmission to the central computer facility for further processing. This document is a functional description of the OPSN computer software. Included are (1) a general discussion of the editing and data conversion process, (2) explanations of the various input forms, (3) examples of the data conversion tables used within the computer programs, (4) the field definitions of the scan sheets, and (5) a flowchart of the entire preprocessing system. (DGC)

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ABSTRACT

This is a functional description of the 690 software program OPSN. OPSN prepares ComSys 1 and 2 Scan Tapes for remote job entry to the IMS data processing programs at the central computer facility.

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OPSN: THE IMS COMSYS 1 AND 2 DATA PREPROCESSING SYSTEM

John Yu

The 690 software program 'OPSN' edits IMS ComSys 1 and 2 Scan Tapes and prepares the data for transmission to the central computer for processing (see TN 5-72-03). OpScan 100 scan sheets received from the schools are scanned by the OpScan 100 Mark Reader and recorded to magnetic tape. OPSN edits this tape and produces another tape which RJS transmits to the IMS resident programs at the central computer.

OPSN PROGRAM DESCRIPTION

OPSN has two modes of input and two forms of output. The input modes are teletype and scan tape. The teletype input mode is presently considered to offer a scanner back-up capability rather than performing an on-line function. Scan tapes processed by OPSN must be prepared by the OpScan 100 Mark Reader in LO (556 BPI) density and EVEN parity. The input tape must be on unit 2 of the 690 system with no write ring, and there must be an end-of-file at the end of all logical tape records. A logical input record is the image of a scan sheet. The two forms of output are card image tape output and printer log output. Magnetic tape output is in HI (800 BPI) density and ODD parity, on unit 3 with write ring. There is an end-of-file at the end of all logical records. A logical output record is one card-image of packed XS40 characters. This version of OPSN can handle six types of scan sheets designed for the OpScan 100. Each of these sheets is identified by the information on the top row of the sheet. OPSN is a table driven program, and all the sheets are processed in accordance with established parameters

stored in the tables. OPSN can be divided into two sections, the initialization section and the tape input section.

INITIALIZATION SECTION

OPSN checks the output tape status first. If the tape is not ON-LINE, a message is typed out to inform the operator and OPSN waits for corrective action. If output tape is ON-LINE, then the operator is requested to provide the header information via teletype.

Header information consists of a six-digit date, four-character tape identifier and a four-digit time. Header information is used as the output tape identity record and makes up the first output tape record. When the header information is received, OPSN then asks if the teletype input option is desired.

The teletype input section is designed to enable new students to be added to the data base of IMS. It has the equivalent function of the IMS Class Identification Sheet used for update purposes. However, no restriction is placed on the form of teletype input. OPSN skips the teletype input section if the operator indicates that it is not desired.

Prior to processing the tape input section, OPSN also checks the input tape. If it is not ON-LINE or at LOAD, a message is typed out and OPSN waits for corrective action.

TAPE INPUT SECTION

When the teletype input is terminated or skipped, OPSN starts processing input tape. The input tape on unit 2 is then read, one scan sheet image at a time. Upon encountering an end-of-file, OPSN returns

to monitor control. There are two types of scan sheets that OPSN can process: IMS Class Identification Sheets and student response sheets. An IMS Class Identification Sheet is used for class ID purpose or data base update purpose. A student response sheet may be one of the following kind: FYCSP Criterion Exercise Response Sheet, LMS Criterion Exercise Response Sheets, Format A and Format B (for HR1, HR2 and MBS), and LMS-HR3 Criterion Exercise Response Sheets, Format A and Format B. Each type of scan sheet is identified by its top row configuration (see Appendix of TN 5-72-28). For an IMS Class Identification Sheet, a special table is used for decoding the sheet and another table is used to direct the output. For student response sheets, the program number, unit number and the page number are used as pointers to a particular table which is used for decoding the sheet.

IMS Class Identification Sheets

OPSN expects the first tape record to be an IMS Class Identification Sheet. A Class Identification Sheet can be used to either identify the class sending data, or to update a class roster. Each time a Class Identification Sheet is encountered, OPSN assumes the start of a new class, and two messages are logged on the line printer: one message indicates the number of records output to tape for the last class processed, and the other indicates the number of scan sheets read for the last class. No error checking is done on an IMS Class Identification Sheet. IMS Class Identification Sheets are decoded according to tables CTAB and CFRTAB (presented in a later section of this paper). New IMS Class Identification Sheets can be handled by simply changing the decode

table CTAB. No distinction is made between an IMS Class Identification Sheet used for a class ID purpose or an IMS Class Identification Sheet used for update purposes. Both of these sheets are processed by the same subroutines. The only logical difference is that an IMS Class Identification Sheet used for updating does not indicate the beginning of a new class.

Student Response Sheets

Because of the completely different ways student response sheets are designed, the processing of each sheet is necessarily different. There are two types of student response sheets. FYCSP and LMS-HR3 scan sheets are designed to collect scores from one student. LMS-HR1, LMS-HR2 and MBS scan sheets are designed to accommodate categorized responses from several students. Each time a student response sheet is encountered, the method by which it is processed is completely determined by its program number, unit number, and page number. The program number is used to index into PGTAB, the program number table. PGTAB contains pointers to the unit number tables of the various programs. The unit number of each sheet is used to index into a unit number table, which contains pointers to the test format tables. A test format table contains information about the number of possible pages in a particular test unit and pointers to the scan sheet decode tables (Fig. 1).

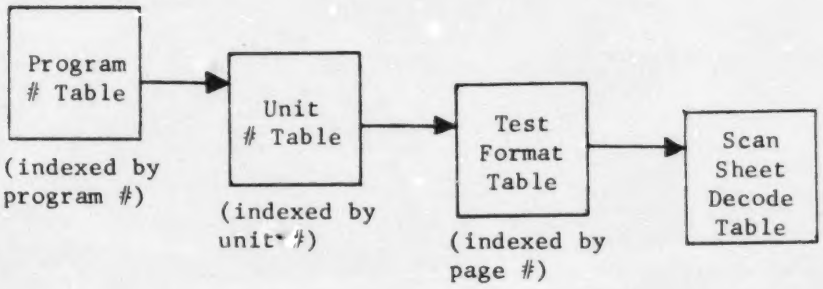


Fig. 1. Top-row information is used for decoding the scan sheet.

FYCSP Criterion Exercise Response Sheets. These sheets have 01 as their program number; there can be ten test units. Presently, all FYCSP units have the same unit number table: FYC1. There are two pages to each unit, and both pages are of the same format. However, OPSN is designed to handle different scan sheet formats for each page of the same unit. The scan sheet decode table of FYC1 presently is set to ten questions per sheet, with each question having three possible responses. OPSN is designed to handle cases where each item can have a different number of possible responses.

LMS-HR3 Criterion Exercise Response Sheets. These sheets have 05 as their program number; there can be sixteen test units. There is only one page to each of these units. Although no page number is used on the scan sheet, OPSN forces the page number to be 1 in order to fit this sheet into the software schema. HR3 scan sheets have two formats: Formats A and B. Both are processed alike since each unit has the same logical format. There are twenty items to each sheet and there are four possible responses per item. For FYCSP as well as for HR3, each item response is scored by the scoring table TAB1. TAB1 is designed to handle up to five possible responses per item.

LMS Criterion Exercise Response Sheets, Format A. LMS-HR1 and HR2 use these sheets for some of their units. Because there is more than one student per scan sheet, and due to the categorical nature of the item responses, LMS sheets are handled somewhat differently from FYCSP or HR3 sheets. The page number and the unit number are still used to index into the test format tables. The page number, however, is used as a list number and it is used to index into the scan sheet decode tables. The scan sheet decode tables are very different from those of FYCSP and HR3. Each scan sheet decode table contains information about the number of possible students on a scan sheet, the number of responses per student, and the ID number of the first student of the sheet. Since each item has one categorized response (yes or no), tables are not needed to decode the responses. Format A has fifteen item responses per student and ten students per sheet. It is used for Units 1-11 for LMS-HR1, and Units 1-8 of LMS-HR2.

LMS Criterion Exercise Response Sheets, Format B. Format B has ten item responses per student and ten students per sheet. It is used for Units 12-15 of LMS-HR1, Units 9-15 of LMS-HR2, and Units 1-15 of LMS-MBS.

TABLE DESIGN

OPSN is considered to be table-driven since new scan sheets can be implemented by changing table values. These tables are very much affected by the way each field on a scan sheet is defined.

The CTAB and CFRTAB tables. The CTAB (Fig. 2) and CFRTAB (Fig. 3) tables are used in processing IMS Class Identification Sheets. The first entry in CTAB indicates the number of fields to be scanned. All other entries of this table point to the locations of CFRTAB in which the information is to be directed. CFRTAB is the output buffer for IMS Class Identification Sheets.

```
4522  4523  CTAB,   .+1       /COVER FORM INTERPRETATION TABLE
4523  7740          -40       /32 HALF WORDS TO BE EXAMINED
4524  4474          CTAB13    /GROUP #
4525  4462          CTAB7     /GRADE
4526  4464          CTAB8     /CLASS
4527  4472          CTAB12    /DAY 2
4530  4462          CTAB2     /DISTRICT 2
4531  4471          CTAB11    /DAY 1
4532  4461          CTAB1     /DISTRICT 1
4533  4464          CTAB4     /SCHOOL 2
4534  4470          CTABEF    /MONTH
4535  4463          CTAB3     /SCHOOL 1
4536  4466          CTAB6     /TEACHER 2
4537  4465          CTAB5     /TEACHER 1
4540  4520          CTAB33    /STUDENT NAME, LAST LETTER
4541  4517          CTAB32    /STUDENT NAME, 19TH LETTER
4542  4516          CTAB31
4543  4515          CTAB30
4544  4514          CTAB29
4545  4513          CTAB28
4546  4512          CTAB27
4547  4511          CTAB26
4550  4510          CTAB25
4551  4507          CTAB24
4552  4506          CTAB23
4553  4505          CTAB22
4554  4504          CTAB21
4555  4503          CTAB20
4556  4502          CTAB19
4557  4501          CTAB18
4560  4500          CTAB17
4561  4477          CTAB16
4562  4476          CTAB15
4563  4475          CTAB14    /STUDENT NAME FIRST LETTER
```

Fig. 2. CTAB Table for Processing IMS Class Identification Sheets.

```
                        *4400
4400    4401    CFRTAB, .+1                 /COVER FORM TABLE, 120 REGISTERS
                        /       /COVER FORM                 /INITIAL CODE
4401    0275    CTABA,  275     /1, PORT ID,1ST DIGIT       /=
4402    0275    CTABB,  275     /0, PORT ID,2ND DIGIT       /=
4403    0240            240                                 /BLANK
4404    0304            304                                 /D
4405    0301    CTABX,  301     /PROG #1                    /A
4406    0324    CTABY,  324     /PROG #2                    /T
4407    0305            305                                 /E
4410    0240            240
4411    0240            240
4412    0240            240
4413    0240            240
4414    0240            240
4415    0240            240
4416    0240            240
4417    0254            254                                 /,
4420    0311            311                                 /I
4421    0304            304                                 /D
4422    0240            240
4423    0240            240
4424    0240            240
4425    0240            240
4426    0240            240
4427    0254            254                                 /,
4430    0324            324                                 /T
4431    0311            311                                 /I
4432    0315            315                                 /M
4433    0305            305                                 /E
4434    0240            240
4435    0240            240
4436    0240            240
4437    0240            240
4440    0240            240
                        *4451
4451    0240    CTAB1,  240     /DIST 1
4452    0240    CTAB2,  240     /DIST 2
4453    0240    CTAB3,  240     /SCHOOL 1
4454    0240    CTAB4,  240     /SCHOOL2
4455    0240    CTAB5,  240     /TEACHER 1
4456    0240    CTAB6,  240     /TEACHER 2
4457    0240            240     /BLANK
4460    0240            240
```

Fig. 3. CFRTAB table for processing IMS Class Identification Sheets

(cont'd on next page)

```
4461   0240                240
4462   0240   CTA07,       240        /GRADE
4463   0240                240
4464   0240   CTA08,       240        /CLASS
4465   0240   CTA09,       240        /YEAR
4466   0240   CTA0A,       240        /YEAR 2
4467   0240   CTA0B,       240        /MONTH 1
4470   0241   CTA0BE,      240        /MONTH 2
4471   0240   CTA011,      240        /DAY 1
4472   0240   CTA012,      240        /DAY 2
4473   0240                240        /GROUP 1
4474   0240   CTA013,      240        /GROUP 2
4475   0240   CTA014,      240        /STUDENT NAME
4476   0240   CTA015,      240
4477   0240   CTA016,      240
4500   0240   CTA017,      240
4501   0240   CTA018,      240
4502   0240   CTA019,      240
4503   0240   CTA020,      240
4504   0240   CTA021,      240
4505   0240   CTA022,      240
4506   0240   CTA023,      240
4507   0240   CTA024,      240
4510   0240   CTA025,      240
4511   0240   CTA026,      240
4512   0240   CTA027,      240
4513   0240   CTA028,      240
4514   0240   CTA029,      240
4515   0240   CTA030,      240
4516   0240   CTA031,      240
4517   0240   CTA032,      240
4520   0240   CTA033,      240

4521   4475   NAMERO,      CTA014     /FIRST LETTER IN THE NAME ENTRIES
```

Fig. 3. Continued

PGTAB, The Program Number Table for Student Response Sheets (Fig. 4). There are presently only five program numbers used. As new programs are implemented, numbers must be assigned in numerical order and be added to the table in front of the label PGEN

```
4600   4600   PGTAB,       .          /FORM FORMAT HEADER TABLE
4601   4607                FYCSP      /LMS-FYCSP, PROGRAM # IS 01
4602   4644                HR1        /LMS-HR1, PROG # IS 02
4603   4663                HR2        /LMS-HR2,PROG # IS 03
4604   4623                MBS        /LMS-MBS,PROG # IS 04
4605   4705                HR3        /HR3, PROG # IS 05
4606   4456   PGEND,       . .        /END OF PROG # TABLE
```

Fig. 4. The PGTAB Table.

Unit Tables. There are five tables, each used by the unit numbers of a particular program (Fig. 5).

```
4637  4637  FYCSP,   .        /FYCSP, UNIT # TABLE
4610  4730            FYC1    /UNIT 1
4611  4730            FYC1    /UNIT 2
4612  4730            FYC1    /
4613  4730            FYC1    /UNIT 4
4614  4730            FYC1
4615  4730            FYC1    /UNIT 6
4616  4730            FYC1
4617  4730            FYC1    /UNIT 8
4620  4730            FYC1    /
4621  4730            FYC1    /UNIT 10
4622  4622  FYCEND,  .        /END OF FYCSP UNIT # TABLE
4623  4623  MBS,     .        /MBS, UNIT # TALBE
4624  4205            FMT2
4625  4205            FMT2    /UNIT 2
4626  4205            FMT2
4627  4205            FMT2    /UNIT 4
4630  4205            FMT2
4631  4205            FMT2    /UNIT 6
4632  4205            FMT2    /
4633  4205            FMT2    /UNIT 8
4634  4205            FMT2
4635  4205            FMT2    /UNIT 10
4636  4205            FMT2    /UNIT 11
4637  4205            FMT2
4640  4205            FMT2    /UNIT 13
4641  4205            FMT2
4642  4205            FMT2    /UNIT 15
4643  4643  MBSEND,  .        /END OF MBS UNIT # TABLE

4644  4644  HR1,     .        /HR1, UNIT # TABLE
4645  4205            FMT2    /UNIT 1
4646  4205            FMT2
4647  4205            FMT2    /UNIT 3
4650  4205            FMT2
4651  4205            FMT2    /UINT 5
4652  4205            FMT2
4653  4205            FMT2    /UNIT 7
4654  4205            FMT2
4655  4205            FMT2    /UNIT 9
4656  4205            FMT2
4657  4205            FMT2    /UINT 11
4660  4316            FMT3    /UINT 12
4661  4316            FMT3
4662  4316            FMT3    /UNIT 14
4663  4316            FMT3    /UNIT 15
4664  4664  HR1END,  .        /END OF HR1 UNIT # TABLE
```

Fig. 5. The Unit Tables (cont'd on next page)

```
4665  4665  HR2,    .          /HR2, UNIT # TABLE
4666  4265           FMT2       /UNIT 1
4667  4265           FMT2
4670  4265           FMT2       /UNIT 3
4671  4265           FMT2
4672  4265           FMT2       /UNIT 5
4673  4265           FMT2
4674  4265           FMT2       /UNIT 7
4675  4265           FMT2       /UNIT 8
4676  4316           FMT3       /UNIT 9
4677  4316           FMT3
4700  4316           FMT3       /UNIT 11
4701  4316           FMT3
4702  4316           FMT3       /UNIT 13
4703  4316           FMT3
4704  4316           FMT3       /UNIT 15
4705  4705  HR2END, .          /END OF HR2 UNIT # TABLE

4706  4706  HR3,    .          /HR3, UNIT # TABLE
4707  4347           FMT4       /UNIT 1
4710  4347           FMT4
4711  4347           FMT4
4712  4347           FMT4
4713  4347           FMT4       /UNIT 5
4714  4347           FMT4
4715  4347           FMT4
4716  4347           FMT4
4717  4347           FMT4
4720  4347           FMT4       /UNIT 10
4721  4347           FMT4
4722  4347           FMT4
4723  4347           FMT4
4724  4347           FMT4
4725  4347           FMT4
4726  4347           FMT4       /UNIT 16
4727  4727  HR3END, .          /END OF HR3 UNIT # TABLE
```

Fig. 5. Continued

Test Format Tables and Scan Sheet Decode Tables. FYC1, FMT2, FMT3 and FMT4 are test format tables. Each test format table is used to direct to scan sheet decode tables. (Fig. 6)

```
4730  7776  FYC1,   -2         /FYCSP TEST FORMAT 1, TWO PAGES PER TEST
4731  4733           PAG11      /PAGE 1 OF FYC1
4732  4735           PAG12      /PAGE 2 OF FYC1
4733  7750  PAG11,  -12        /TEN QUESTIONS ON THIS PAGE
4734  4241           QU111      /FYC1, PAGE 1, QUESTION 1
4735  7750  PAG12,  -12        /TEN QUESTIONS ON THIS PAGE
4736  4253           QU121      /FYC1, PAGE 2, QUESTION 1
```

Fig. 6. Test Format Tables and Scan Sheet Decode Tables (cont'd on next two pages).

```
4241  7775  QU111,  -3       /TEST 1,PAGE 1,QUESTION 1
4242  7775           -3       /QUESTION 2, # OF POSSIBLE REPONSES
4243  7775           -3       /Q3
4244  7775           -3
4245  7775           -3       /Q5
4246  7775           -3
4247  7775           -3       /Q7
4250  7775           -3
4251  7775           -3       /Q9
4252  7775           -3       /Q10
4253  7775  QU121,  -3       /TEST 1,PAGE 2,QUESTION 1
4254  7775           -3       /Q2
4255  7775           -3
4256  7775           -3       /Q4
4257  7775           -3
4260  7775           -3       /Q6
4261  7775           -3
4262  7775           -3       /Q8
4263  7775           -3
4264  7775           -3       /Q10
4265  7772  FMT2,   -6       /LMS FORM HAS 6 PAGES PER FORM
4266  4274           PAG21
4267  4277           PAG22
4270  4302           PAG23
4271  4305           PAG24
4272  4310           PAG25
4273  4313           PAG26    /FMT2, PAGE 6
4274  7765  PAG21,  -12      /FMT2, PAGE 1, TEN STUDENTS THIS PAGE
4275  7761           -17      /15 QUESTIONS PER STUDENT
4276  0001           1        /STUDENT ID OF FIRST STUDENT ON THIS PAGE
4277  7765  PAG22,  -12      /FMT2, PAGE 2, TEN STUDENTS THIS PAGE
4300  7761           -17
4301  0013           13
4302  7765  PAG23,  -12      /FMT2, PAGE 3
4303  7761           -17
4304  0025           25       /STUDENT ID OF FIRST STUDENT ON THIS PAGE
4305  7765  PAG24,  -12      /FMT2, PAGE 4
4306  7761           -17
4307  0037           37
4310  7765  PAG25,  -12
4311  7761           -17
4312  0051           51
4313  7765  PAG26,  -12      /FMT2,PAGE 6
4314  7761           -17
4315  0063           63
4316  7772  FMT3,   -6       /LMS FORM B, 6 PAGES PER FORM
4317  4325           PAG31    /FMT3, PAGE 1
4320  4330           PAG32
4321  4333           PAG33
4322  4336           PAG34
4323  4341           PAG35
4324  4344           PAG36
```

Fig. 6. Continued

```
4325  7760  PAG31,  -12      /FMT3,PAGE 1, TEN STUDENTS THIS PAGE
4326  7760          -12      /TEN QUESTIONS PER STUDENT
4327  0001          1
4330  7766  PAG32,  -12      /FMT3,PAGE 2
4331  7766          -12
4332  0013          13
4333  7766  PAG33,  -12      /FMT3,PAGE 3
4334  7766          -12
4335  0025          25       /STUDENT ID OF FIRST STUDENT ON THIS PAGE
4336  7766  PAG34,  -12
4337  7766          -12
4340  0037          37
4341  7766  PAG35,  -12
4342  7766          -12
4343  0051          51
4344  7766  PAG36,  -12      /FMT3, PAGE 6
4345  7766          -12
4346  0063          63
4347  7777  FMT4,   -1       /FMT4, ONE PAGE
4350  4351          PAG41
4351  7754  PAG41,  -24      /20 QUESTIONS PER PAGE
4352  4353          QU411
4353  7774  QU411,  -4       /Q1
4354  7774          -4
4355  7774          -4       /Q3
4356  7774          -4
4357  7774          -4
4360  7774          -4
4361  7774          -4
4362  7774          -4       /Q8
4363  7774          -4
4364  7774          -4       /Q10
4365  7774          -4
4366  7774          -4
4367  7774          -4
4370  7774          -4
4371  7774          -4       /Q15
4372  7774          -4
4373  7774          -4
4374  7774          -4
4375  7774          -4
4376  7774          -4       /Q20
```

Fig. 6. Continued

TAB1, Response Pattern Table. This is used by FYCSP and HR3 scan sheets to handle multiple responses for a question. A maximum up to five responses are allowed. In the response pattern column in the table below, a 1 (one) is used to indicate a response in that position, a 0 (zero) is used to indicate no response. (Fig. 7)

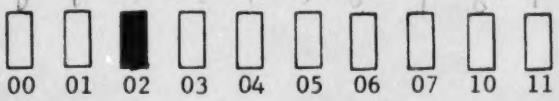
```
42..  4201  TAB1,   .*1.
            /       CODE    OUTPUT   RESPONSE PATTERN
4201    0260        260     /(       /00000
4202    0261        261     /1       /10000
4203    0262        262     /2       /01000
4204    0301        301     /A       /11000
4205    0263        263     /3       /00100
4206    0302        302     /B       /10100
4207    0303        303     /C       /01100
4210    0304        304     /D       /11100
4211    0264        264     /4       /00010
4212    0305        305     /E       /10010
4213    0306        306     /F       /01010
4214    0307        307     /G       /11010
4215    0310        310     /H       /00110
4216    0311        311     /I       /10110
4217    0312        312     /J       /01110
4220    0313        313     /K       /11110
4221    0265        265     /5       /00001
4222    0314        314     /L       /10001
4223    0315        315     /M       /01001
4224    0316        316     /N       /11001
4225    0317        317     /O       /00101
4226    0320        320     /P       /10101
4227    0321        321     /Q       /01101
4230    0322        322     /R       /11101
4231    0323        323     /S       /00011
4232    0324        324     /T       /10011
4233    0325        325     /U       /01011
4234    0326        326     /V       /11011
4235    0327        327     /W       /00111
4236    0330        330     /X       /10111
4237    0331        331     /Y       /01111
4240    0332        332     /Z       /11111
```

Fig. 7. The TAB1 Table.

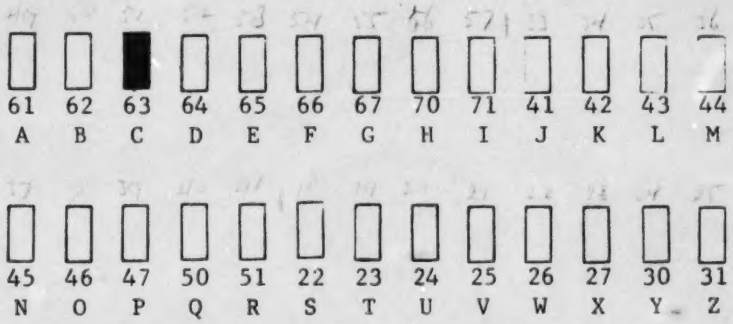
FIELD DEFINITIONS OF SCAN SHEETS

An input tape contains scan sheet images with each scan sheet image made up of scan fields. Each scan field consists of one character of the tape record. There are three types of fields: numeric, alphabetic and ANY/ALL.

Numeric Field. An unmarked numeric field is called a blank field, and the character on tape is 20_8. A marked field has a value other than 20_8 for the corresponding character on tape, and the value used corresponds to the position of the darkest mark in the field counting from the left. There can only be ten positions in a numeric field. For a marked numeric field, the leftmost position if 00_8. For example, if the darkest mark in such a field is the third position, the value for the field would be 02_8:



Alphabetic Field. An unmarked alphabetic field produces 20_8 as the value of the character on tape. There can be 26 positions in such a field. Values for an alphabetic field are as follows:

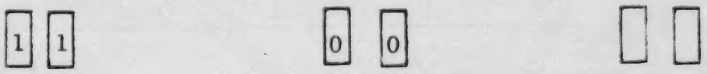


For example, if the darkest mark in an alphabetic field is the third position, the value of the field would be 63_8 as the octal equivalent of the letter C.

ANY/ALL Field. There are six positions in an ANY/ALL field. The leftmost two are always on. There can be up to four response positions:

on bits possible response positions

If less than four positions are used, the rightmost bits are used and the leading bits are set to zero. Example, for two positions, we have:



on bits set to zero response positions

A blank field is 60_8. An ANY/ALL field does not use darkest mark selection; if more than one position is detected as marked, the output will indicate this fact. e.g., for a four position ANY/ALL field marked thus:

on bits response positions

the value for the field is 65_8.

SWRI

FLOWCHART LAYOUT FORM

PROGRAMMER: John W. Yu
PROGRAM ID: OPSN: The IMS ComSys 1 and 2 Preprocessing System
DATE: April 1972
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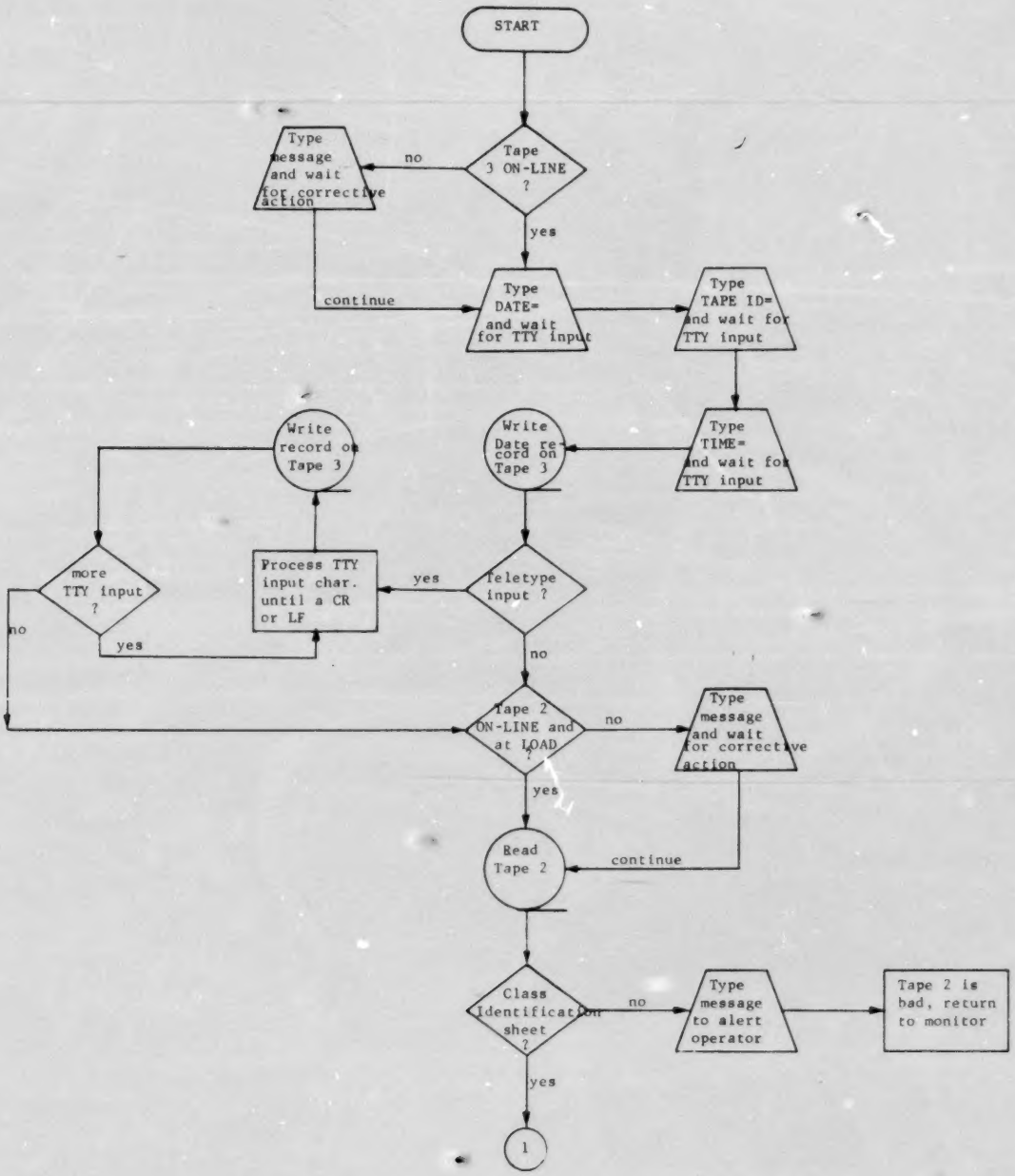

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Flowchart Layout Form

Programmer: John Yu
Date: April 1972
Program ID: OPSN: The IMS ComSys 1 and 2 Preprocessing System
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